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PNEUMATIC TRANSPORT OF RAW MATERIAL FROM WHARF TO TANK

by Atle Sangolt

Trials with pneumatic raw material conveyor gave very promising results when limited experiments were carried out by A/S Sildefiskernes Fabrikklag (Factory Assoc. of the Herring Fisheries), Horsoy, in fall 1979. The initiative had been taken by the supplier Oscarsson and Sjogren A/B, Stockholm, and Makin A/S Zeta in the capacity of possible Norwegian representative of the system.

The system is used in slaughterhouses to convey manure, bone fragments, intestines, and other slaughter waste.

A temporary structure was set up between the wharf and a raw material tank, and trawl fish of various sizes, as well as mackerel, were conveyed with it successfully.

Flexible system with low maintenance costs

The system consists of an air blower sending the raw material through suitable pipes to the receiving station at 500 - 800 kPa (5 - 8 kp/cm^2). A 150-mm pipe was used for the trial.

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The air blower has several air inlets, and it is possible to use such a dosage of fish/air that a certain degree of fluidization is achieved. Thus, this method of conveyance has the following characteristics :

* Low friction and correspondingly, little loss of energy
* High speed of transport but yet gentle treatment of fish
* Pipe is fully emptied at each blast

A pneumatic conveyor system can be constructed with several blowing and receiving points. Different conveying tasks can be carried out, by means of centrally operated pipe switches and valves, in sequences and partially over the same pipe arrangement. These conveyor facilities, being sturdy, are reported to have quite modest maintenance costs. The blower sizes range from 100 to 8 000 L, and the latter figure probably constitutes no upper limit. Usually the blowers are mounted on scales, with flexible connections to the conveyor pipes. In this way it is possible to register the conveyed quantities accurately without using separate measures or weights.

Competitor for displacement pump ?

The Horsoy trials were very successful. About 200 L of fish was conveyed each time in seconds over a distance of 20 m up to a raw material tank placed 4 - 5 m above the wharf. The maximum operating pressure was about 550 kPa, and the plant worked as planned. There were no essential differences between the air quantities used for the different fish species "blasted", and even a load of large pollack found its way through the 90^{o} pipe angle without difficulty.

Furthermore, the small pipe dimensions, in comparison with dimensions required by effective pump transport, make these pneumatic plants interesting in places where the transport distances are relatively long, regardless of the fact that when compressed air is used, more total energy is required per unit of quantity than in pumping. Without dealing in detail with the factors affecting air consumption and their relative significance, it can be roughly estimated that air consumption per blast is equal to the sum of the blower and pipe volume multiplied by pressure in kp/cm^2.

Air consumption refers to volume of air at normal pressure and temperature.

Pneumatic plants can be assumed to have significantly better anti-freeze properties than conveyor systems based on pumping.

Captions : 1) A 200-L air blower and part of the conveyor pipe.

2) Sandeel and other small fish discharging from the conveyor pipe.